ELECTRONIC DEVICE INCLUDING ANTENNA DEVICE

PRIORITY

[0001] This application claims priority under 35 U.S.C. §119(a) to Korean Patent Application Serial No. 10-2015-0109186, which was filed in the Korean Intellectual Property Office on Jul. 31, 2015, the entire content of which is incorporated herein by reference.

BACKGROUND

[0002] 1. Field of the Disclosure

[0003] The present disclosure relates generally to an electronic device, and more particularly, to an electronic device that includes a metal member around an antenna radiator of an antenna device, thereby reducing a degradation in antenna performance.

[0004] 2. Description of the Related Art

[0005] Electronic devices may be equipped with at least one antenna that is suitable for an individual service, such as location tracing, wireless communication, global roaming, etc. With the slimness of electronic devices and an increase in the number of components that are equipped to the electronic devices for multiple functions, it may be difficult to ensure antenna performance, which is an important factor of wireless mobile communication.

[0006] Accordingly, when an antenna is mounted on a user device with inadequate space, as a result of too many peripheral elements being provided on the user device, antenna performance may be degraded.

SUMMARY

[0007] Aspects of the present disclosure provide an electronic device having a wireless communication function that can ensure antenna performance of an antenna device.

[0008] In accordance to an aspect of the present disclosure, there is provided an electronic device. The electronic device includes a housing including a window that forms a first side of the electronic device, and a second side that is disposed opposite to the first side, a touch sensor disposed adjacent to the window and configured to generate a capacitance, an input circuit operably connected to the touch sensor and configured to detect an input based on a variation in the capacitance, an antenna radiator at least one of partially disposed inside the housing and a part of the housing, a ground operably disposed between the first side and the second side, a communication circuit operably connected to the antenna radiator and the ground, and an antenna matching circuit operably connected to the touch sensor and the input circuit.

[0009] In accordance to another aspect of the present disclosure, there is provided an electronic device. The electronic device includes a housing that includes a window that forms a first side of the electronic device, and a second side of the electronic device that is disposed opposite to the first side, a circuit board operably disposed between the first side of the electronic device and the second side of the electronic device and including a ground, a first conductive plate and a second conductive plate that are operably disposed between the first side of the electronic device and the circuit board and that are disposed adjacent to and spaced apart from the window, an input circuit mounted on the circuit board and configured to detect a first input based on a variation in a capacitance of the first conductive plate and to detect a second input based on a variation in a capacitance of the second conductive plate and, a first contact and a second contact, the first contact mounted on the circuit board and configured to electrically connect the input circuit and the first conductive plate and the second contact mounted on the circuit board and configured to electrically connect the input circuit and the second conductive plate, an antenna radiator at least one of partially disposed inside the housing and a part of the housing, a communication circuit mounted on the circuit board and operably connected to the antenna radiator and the ground, and an antenna matching circuit mounted on the circuit board and operably connected to at least one of the first conductive plate and the second conductive plate and the input circuit.

[0010] In accordance with another aspect of the present disclosure, there is provided a method for operating an electronic device. The method includes electrically connecting an antenna radiator of the electronic device to a communication circuit of the electronic device and electrically connecting an antenna matching circuit of the electronic device to a touch sensor of the electronic device and an input circuit of the electronic device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The above and other aspects, features, and advantages of certain embodiments of the present disclosure will be more apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

[0012] FIG. **1** is a diagram illustrating an electronic device, according to an embodiment of the present disclosure;

[0013] FIG. **2** is a diagram illustrating an electronic device, when viewed in various directions, according to the embodiment of the present disclosure;

[0014] FIG. **3** is a diagram illustrating an electronic device, according to an embodiment of the present disclosure;

[0015] FIG. **4** is a diagram illustrating an electronic device, according to the embodiment of the present disclosure;

[0016] FIG. **5** is a diagram illustrating a coupling state between a spacer and a circuit board, when viewed in the direction from the front to the back of the electronic device, according to an embodiment of the present disclosure;

[0017] FIG. **6** is a diagram illustrating the coupling state between the spacer and the circuit board, when viewed in the direction from the back to the front of the electronic device, according to the embodiment of the present disclosure;

[0018] FIG. **7** is a is a diagram illustrating the coupling state between the spacer and the circuit board, according to the embodiment of the present disclosure;

[0019] FIG. **8** is a diagram illustrating a coupling state between a display device, the spacer, a key plate, the circuit board, a case frame, and a cover, according to an embodiment of the present disclosure;

[0020] FIG. **9** is a diagram illustrating an electronic device, according to an embodiment of the present disclosure;

[0021] FIG. **10** is a diagram illustrating a key plate, according to an embodiment of the present disclosure;